

**US OIL RECOVERY SUPERFUND SITE  
WORK PLAN REFINEMENT/MODIFICATION NOTICE**

**REFERENCE DOCUMENTS:** Remedial Investigation/Feasibility Study (RI/FS) Work Plan, Sampling and Analysis Plan Volume I Field Sampling Plan (FSP), Sampling and Analysis Plan Volume II Quality Assurance Project Plan (QAPP) (all dated December 23, 2015)

**DATE:** August 19, 2016

**DESCRIPTION OF REFINEMENT/MODIFICATION:**

This Work Plan Refinement Notice (WRN) includes additional activities related to (1) delineation of a reported historical pit containing arsenic-impacted soils using geophysical methods, (2) hand-probing and digging to evaluate the potential presence of a historical underground vault on the western side of the warehouse, and (3) background soil sampling.

Delineation of a Possible Historic Burial Pit

Geophysical methods are proposed to delineate a possible historical burial pit reportedly containing arsenic-impacted soils. The arsenic-impacted soils were reportedly removed from the area to the west of the warehouse in approximately 1973 and placed in borrow pits that were lined with lime. Based on observations made from soil borings, aerial photographs, and a walking field survey, the pit area located within the southwest quadrant of the property is proposed to be surveyed using geophysical methods (Figure 1). The use of non-intrusive methods is proposed to determine the dimensions of the pit so that traditional investigative techniques can be used carefully in the area of the pit.

Electromagnetic technology will be used to evaluate the horizontal extent of the historical pit using a Geonics EM 31 instrument. Electromagnetic measurements will be taken by inducing a current into the ground using a transmitter coil to create a secondary electromagnetic field, which is measured by a receiver coil. The EM 31 will be used to perform a walking survey along transects within an area that slightly exceeds the expected dimensions of the pit. Evaluation of the electromagnetic data should show the differences between the pit materials and native soil.

To evaluate the vertical extent of the pit, a resistivity survey will be performed using an Advanced Geosciences Inc. SuperSting R8 resistivity meter. Resistivity will be measured by inducing a current into the ground along electrodes and measuring the associated voltages. Apparent resistivity is calculated using this data. The resistivity survey will be performed along transects with an electrode spacing between 2.5 and 5 feet, which will enable 20 to 40 feet of depth exploration.

The data gathered during the geophysical survey will be used to estimate the dimensions of the historical pit and the data will be used to plan future investigative activities related to the pit.

Former Vault Delineation

During the May 2, 2016 mobilization, what appeared to be a continuous obstruction ranging in depth from 0.5 – 4 feet below ground surface was encountered within an area north of the containment pond and west of the warehouse; this obstruction is thought to be the former arsenic vault noted in historical documents. The dimensions, historical use and current status of the vault are unknown. The estimated dimensions of the vault are shown on Figure 1.

To estimate the dimensions of the historical vault, digging and probing of the area is proposed. The area will be probed with a tile probe until the edges of the obstruction are encountered. Pin flags will be placed at the boundaries to demarcate the approximate dimensions of the vault. Next, approximately 10 borings will be hand-dug using either a hand auger or shovel until the vault continuity and boundaries are confirmed. The borings will be backfilled once total depth is reached and visual observations of the vault

construction have been made. The data will be used to evaluate future investigative activities related to the vault. Based on the findings of this initial investigation, the need for additional delineation or excavation will be evaluated.

#### Background Soil Study

Per Section 5.6.4.1 of the RI/FS Work Plan, the background soil study will be performed within the City of Pasadena Memorial Park (Figure 2). As detailed in the RI/FS Work Plan, 10 samples will be collected from a tidally-influenced area and 10 samples from an upland area that is not tidally-influenced. Based on preliminary research, within the background study area, the area very near the shore is tidally influenced, while the upland area selected for the study is not tidally-influenced. Each sample will be collected from the 0 to 0.5 feet below ground surface (bgs) interval using hand tools such as pre-cleaned disposal plastic trowels or a hand auger. The soil samples will be analyzed in the laboratory for metals, SVOCs, and pesticides/herbicides. The analytes evaluated in the laboratory will be in accordance with the analyte lists specified in the QAPP for those groups of compounds. All other methods for sample collection, processing, shipment, etc. will be per the RI/FS Work Plan, FSP, and QAPP.

The soil background datasets for the tidally-influenced and non-tidally influenced areas will be initially evaluated separately using statistical population comparisons. Based on the results of the statistical population comparisons and field observations, professional judgement will be used to decide whether separate statistical analysis will be performed to derive background values from the tidally and non-tidally influenced background sample data sets or if both datasets will be combined and analyzed together to derive background values from the entire data set. For each analyte, the data will be evaluated for potential outliers and data distribution using EPA's ProUCL statistical software. Based on the data distribution of each analyte, an appropriate statistic such as an Upper Tolerance Limit (UTL) or similar statistic will be calculated using ProUCL for each analyte. The resulting statistic is proposed to be used as the site-specific background concentration for that analyte.

The need for additional background soil sampling will be addressed after the data from the proposed background study and the site soil investigation are evaluated.

#### **RATIONALE FOR REFINEMENT/MODIFICATION:**

##### Historical Pit Containing Arsenic-Impacted Soils Delineation

The general location of the pit containing arsenic-impacted soils was initially defined by soil borings and a walking survey. Additional survey of the pit using geophysical methods will further define the pit dimensions and aid in the planning of future activities related to the pit.

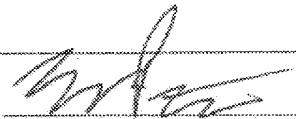
##### Historical Vault Delineation

The approximate location of the arsenic pit was identified during a review of historical documents and pre-probing during field investigation activities. Delineating the historical vault more accurately based on field observations will aid in planning future activities related to the historical vault.

##### Background Soil Study

As specified in the RI/FS work plan, this WRN provides additional details of the background soil sampling, including sample locations, the COPCs to be analyzed and the statistical methods to be used to evaluate the background soil analytical data.

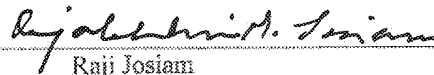
Respondents' Project Coordinator:

  
Eric Pastor  
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Date:

8/19/16

EPA Project Manager:

  
Raji Josiam

Date:

8/19/16

## FIGURES



**EXPLANATION**

- |     |   |   |  |
|-----|---|---|--|
| --- | Approx. Property Boundary   | ⊕ | CPT Location   |
| —○— | Approx. Security Fence  | △ | CPT/ROST Location  |
| ●   | Proposed Soil Boring Location (Source Areas/Industrial Activities)            | ⊗ | CPT Location - Eliminated due to Underground Obstruction         |
| ●   | Proposed Soil Boring Location (Drainage Areas)                                | ⊗ | Soil Boring Location - Eliminated due to Underground Obstruction |
| ●   | Surface Water Sample Location   | ■ | Approx. Extent of Geophysical Survey                             |
| ⊗   | Surface Water Sample Location - Not Collected due to absence of Surface Water | ■ | Approx. Extent of the Tile-Probing and Hand Digging              |
| ▲   | Sediment Sample Location  |   |  |
| ●   | Proposed Monitoring Well Location   |   |  |

Notes:  
1. Proposed locations are approximate and subject to change.  
2. Highlighted sample locations have been completed and surveyed.

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PASADENA, HARRIS COUNTY, TEXAS

Figure 1

**PROPOSED INVESTIGATION AREAS FOR BURIAL PIT AND VAULT**

PROJECT: 3333	BY: AJD	REVISIONS
DATE: AUG., 2016	CHECKED: MKW	

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**EXPLANATION**

- Approx. Property Boundary
- ..... Proposed Background Area
- ▲ Proposed Non-Tidally Influenced Background Sample Location
- Proposed Tidally Influenced Background Sample Location



Approx. Scale in Feet

0 250 500

Source:  
Houston-Galveston Area Council, April 2012 Image, 2012 Aerial Imagery Data is the sole property of Houston-Galveston Area Council, which reserves all rights thereto. Use or reproduction of this data is strictly prohibited absent written consent from the Houston-Galveston Area Council.

**US OIL RECOVERY SUPERFUND SITE  
PASADENA, HARRIS COUNTY, TEXAS**

Figure 2

**PROPOSED BACKGROUND  
SOIL SAMPLE LOCATIONS  
MEMORIAL PARK, PASADENA, TX**

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DATE: AUG, 2016	CHECKED: MKW	

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